

CONFIDENTIAL
CONFIDENTIAL

50X1-HUM

Other reports on this subject were delivered by Engineers N. V. Chernobrovov, Mosenergo (Moscow Regional Electric Power Administration); V. S. Benin, Leningrad; A. A. Voskresenskiy, Gorenergo; and M. M. Feyermark, Glavelektromontazh (Main Administration of Electrical Installations). It was shown that the percentage of proper functioning of protective relaying equipment had increased from year to year. Cases of defective operation of such equipment, when the fault of the plants, will be corrected in the very near future. A number of practical suggestions in this direction were contributed by the following participants in the debates: Engineers F. F. Deryugin, Chelyabenergo; Ye. S. Gaba, Pontassenergo; D. T. Sergeyev, Mosenergo; S. Ye. Kashprovskiy, Kievenergo; O. A. Gil'cher, TsLEM (Central Laboratory of Electrical Installations), Mosenergo; V. M. Yermolenko, TEP; A. T. Durova, VVS (High-Voltage Network), Mosenergo; and Professor I. I. Solov'yev, TsNIEL. They urged the MEP to help the relay-building enterprises in matters of equipment and personnel.

Six papers were devoted to new Soviet developments in the field of protective relaying. Candidate in Technical Science M. I. Tsarev (TsNIEL) presented a report on "New Efforts in the Field of Differential Protection of Generator and Transformers." The basic causes for faulty operation of this type of protection are transient processes in current transformers and magnetizing current surges of power transformers on voltage recovery, following the disconnection of an external short circuit. As the result of theoretical and experimental research in TsNIEL of MES, a simple differential protection, using rapid-saturation current transformers, was developed for transformers, generators, and bus bars of high-voltage substations. The relay laboratories of TEP and TsLEM, Mosenergo, have developed differential protection relays for two-winding transformers, in which rapid-saturation current transformers (BNT) operate in conjunction with restraining coils, resulting in differential protection of high sensitivity. Engineer G. T. Grek, of TEP, reported on work in the selection of optimum parameters for rapid-saturation current transformers; Engineer O. A. Gil'cher (TsLEM, Mosenergo) spoke on relays with rapid-saturation current transformers for sensitive differential protection of two-winding transformers produced in Mosenergo.

Professor I. I. Solov'yev of TsNIEL, read a paper on "Automatic Repeated Reclosing," in which he brought out the following: Automatic repeated reclosing of transmission lines is an effective measure for raising the dependability of electric power supply. Every automatic repeated reclosing unit prevents one breakdown per year on the average. In circuit breakers with remote switching, automatic repeated reclosing units with automatic return to the position of readiness for the next operation should be used. In circuit breakers which are not remotely controlled, mechanical automatic repeated reclosing units should be employed. The MEP should organize mass production of mechanical automatic repeated reclosing units. Solov'yev also gave the technical characteristics of an electrical automatic repeated reclosing unit developed by the TsNIEL and accepted for production by the electrical industry. He also emphasized the high efficiency of phase-by-phase automatic repeated reclosing in electric power systems. Engineer P. K. Feyst, of TsNIEL, presented a paper on a selective device developed for phase-by-phase automatic repeated reclosing with balanced relays having minimum total resistance.

Candidate in Technical Science A. M. Bresler of an MEP plant spoke on "Distance-Relay Protection of Transmission Lines" and reported on distance relays already in use as Relay PZ-151 for lines with low ground currents, and Relay PZ-155 for lines with sizable ground currents. The development of a distance-protection circuit against single-phase short circuits in systems with a floating neutral has been completed.

In his paper, Professor G. I. Atabekov, Doctor of Technical Science of TsNIEL, suggested distance relay protection for medium-haul lines against interphase short circuits by the use of a quadruple-relay system and protection

- 2 -

CONFIDENTIAL

CONFIDENTIAL

50X1-HUM

CONFIDENTIAL
CONFIDENTIAL

against ground faults by the use of a single-relay system. Such protection is suitable both for systems with three-phase interruption and systems with interruption by phases. Gruzenergo (Georgian Electric Power Administration) has had favorable operating experience with the protection method suggested.

Engineer A. D. Shleyfman, of TsLEM, Mosenergo, discussed two types of distance relays developed in Mosenergo for long, heavily loaded lines.

Engineer Ye. D. Zeylidzon (Technical Administration of MES) in a second paper, entitled "Protection of Generators Against Grounding," showed that the artificial establishment of active grounding currents for protective purposes reduced the reliability of systems supplied from the generator. New Soviet grounding protection equipment affords protection using only low grounding currents and makes it possible to compensate for high capacitive currents in the system. A decision was made by the Technical Administration of MES not to act on the elimination of grounding protection in generator-voltage systems and for generators with small capacitive grounding currents.

Candidate in Technical Science Ya. M. Smorodinskiy, of TEP, presented a paper on "High-Frequency Protection of Transmission Lines." He discussed the latest high-frequency protection equipment developed in the USSR, which is based on symmetrical current and voltage components. Engineers Ye. D. Sapir, of TsNIEL, and O. A. Gil'cher, of TsLEM, reported on the results of operation of high-frequency, phase-differential protection developed by TsNIEL. Candidate in Technical Science I. N. Popov told of the work done by TsNIEL in the field of inertialess, directional, reverse-sequence, high-frequency protection.

Engineer A. S. Tulin, of an MEP plant, presented a paper on "New Relay Design," discussing particularly the differential protection of three-winding transformers through the use of rapid-saturation current transformers having triple-rod cores.

The following took part in the discussions of a paper on new Soviet developments in the field of relay protection: Engineer A. B. Barzam, Gvtsentrentsergo (Main Administration of the Central Electric Power System); Engineer A. M. Yarovskiy, Sverdlovenergo; Candidate in Technical Science A. M. Bresler, of an MEP plant; Engineer A. A. Voskresenskiy, Gorenergo; Engineer Yu. A. Gayevenko, TEP; Engineer Ye. V. Varlamov, Lenenergo; Engineer M. M. Bogina, TsNIEL; Engineer M. S. Prokunin, Technical Administration of MEP; and Engineer N. V. Chernobrovov, Mosenergo.

Candidate in Technical Science I. A. Syromyatnikov (Technical Administration of MES) mentioned a number of problems of importance in the operation of relay protection and automatic devices. He pointed out that automatic field strength control should be introduced in all generators, and all suspension lines should be equipped with automatic repeated reclosing. Further, Syromyatnikov stated that automatic introduction of reserves for the internal needs of power stations should be used more widely as protection based on the through ac in high-voltage systems. The development of gigantic hydroelectric power stations will require great collaborative efforts on the part of scientific research, planning and operational organizations, and the plants of the MEP.

Resolutions adopted by the session dealt with methods for further improvement of relay equipment, and recommendations were made for a broadening of the nomenclature of relays and complete protective units in production.

- E N D -

CONFIDENTIAL

- 3 -

CONFIDENTIAL